THE UNIVERSITY OF CHICAGO

THE AGRICULTURAL ECONOMY OF THE AMERICAN BOTTOMS

A PART OF A DISSERTATION SUBMITTED TO
THE FACULTY OF THE DIVISION OF THE
PHYSICAL SCIENCES IN CANDIDACY FOR THE
DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF GEOGRAPHY
1938

By
MENDEL E. BRANOM

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PART I[1]

DISTRIBUTIVE RELATIONSHIPS OF THE AGRICULTURAL PATTERN

Orientation

The location and extent of the American Bottoms.—Between Alton and Prairie du Pont Creek a notable expansion of the flood plain of the Mississippi River is known as the American Bottoms[2] (Fig. 1). The adjoining bluffs of weak Pennsylvanian rocks, overlain with glacial and loessial deposits, attain a maximum height in excess of two hundred feet above the flood plain but have been weathered and mellowed to such an extent that in most places it is possible to walk without difficulty to their summits (Fig. 2). Moreover, the continuity of the bluffs is interrupted here and there by valleys with intermittent or perennial streams.

The northern terminus of the American Bottoms is marked by a bold escarpment of limestone between which and the river a semi-artificial strip of lowland is barely wide enough for one railroad and one highway (Fig. 3). The southern terminus of the American Bottoms is similarly marked by precipitous limestone bluffs (Fig. 4). Between these bluffs and the river the flood plain is less than four miles in width.

The area of the American Bottoms is slightly in excess of one hundred thousand acres, of which about two-thirds is located in Madison County and about one-third in St. Clair County, Illinois. The region has a maximum north-south extent of about twenty-four miles and a maximum east-west extent of about eleven miles.

Salient features of the American Bottoms.—The American Bottoms is a nearly level alluvial plain approximately one-sixth of which consists

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[1]This article is an abridgment of a dissertation (213 manuscript pages) which includes 17 maps, 32 graphs, 7 tables, and 44 pictures. Part I is essentially the same as Chapter I in the complete dissertation.

[2]N. M. Fenneman, *Physiography of the St. Louis Area* (Urbana: University of Illinois, 1909), p. 73.

of swamps and shallow lakes. Nearly all the timber, which formerly covered a large proportion of the area, has been removed except in some of the swamps. The surface drainage, naturally dependent on shifting meandering channels, has been improved by the construction of artificial and semi-artificial channels. Levees have been constructed to protect much of the flood plain from overflows of the Mississippi River; natural channels have been improved and artificial channels have been constructed to facilitate the movement of upland waters across the flood plain.

The soil types include loams, clays, and sands. The loams, considered best from an agricultural standpoint, predominate.

The salient features of the cultural pattern (Table 1) are: (a) twenty agricultural sections which comprise almost two-thirds of the total acreage; (b) two urban and suburban districts; (c) scattered small settlements including resort centers associated with lakes and streams; (d) railroads and highways, especially those which converge from breaks in the bluffs on the Southern Urban and Suburban District; and (e) extensive levee and drainage systems.[1]

TABLE 1

A CLASSIFICATION OF THE ACREAGE OF THE AMERICAN BOTTOMS

Classification	Acreage	Per Cent of Total Acreage
Agricultural sections	64,749.5	64.19
Southern Urban and Suburban District	22,640.0	22.44
Northern Urban and Suburban District	6,170.0	06.11
Swamps and water bodies not associated with operated farms	2,526.0	02.50
Resort centers and other small settlements	1,822.0	01.80
Rural railroad property and highways	1,520.0	01.50
Rural areas occupied by levees and drainage ditches	1,420.0	01.40
Total	100,847.5	99.94

[1]Throughout the dissertation, unless otherwise stated, statistical data are based on field work in Madison County in 1933 and in St. Clair County in 1934.

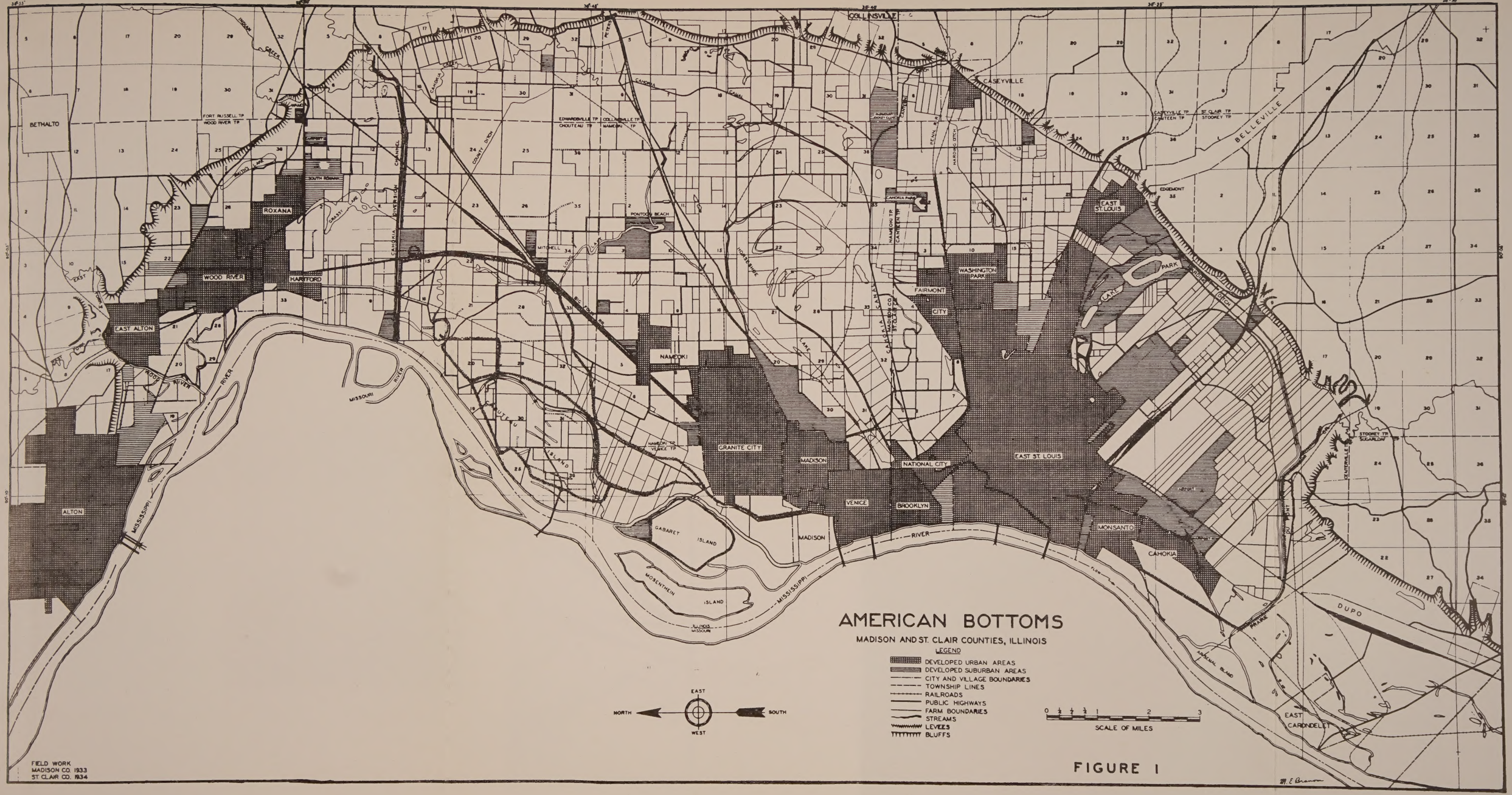
AMERICAN BOTTOMS
MADISON AND ST. CLAIR COUNTIES, ILLINOIS
LEGEND
DEVELOPED URBAN AREAS
DEVELOPED SUBURBAN AREAS
CITY AND VILLAGE BOUNDARIES
TOWNSHIP LINES
RAILROADS
PUBLIC HIGHWAYS
FARM BOUNDARIES
STREAMS
LEVEES
BLUFFS
SCALE OF MILES
EAST
NORTH
SOUTH
WEST
FIELD WORK
MADISON CO. 1933
ST. CLAIR CO. 1934
BETHALTO
ROXANA
WOOD RIVER
HARTFORD
EAST ALTON
ALTON
GRANITE CITY
MADISON
NATIONAL CITY
VENICE
BROOKLYN
EAST ST. LOUIS
MONSANTO
CAHOKIA
EAST CARONDELET
COLLINSVILLE
CASEYVILLE
FAIRMONT CITY
WASHINGTON PARK
PONTOON BEACH
DUPO
MISSISSIPPI RIVER
MISSOURI RIVER
GABARET ISLAND
MOSENTHEIN ISLAND
PIASA ISLAND
BELLEVILLE

FIGURE 1

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FIG. 2—Characteristic mellow bluffs bordering the American Bottoms.

FIG. 3—Resistant limestone bluffs at the northern terminus of the American Bottoms.

FIG. 4—Resistant limestone bluffs at the southern terminus of the American Bottoms. A quarry has been opened at this place.

During most of the nineteenth century, the American Bottoms was noted chiefly for agricultural productivity. The only large concentration of population was in the East St. Louis area, on the opposite bank of the Mississippi River from St. Louis. Since 1896, however, when the Niedringhaus interests moved their enameling and stamping plant from St. Louis to the East Side and founded Granite City,[1] a notable expansion of the Southern Urban and Suburban District has taken place. A similarly rapid expansion of the Northern Urban and Suburban District began with the construction of an oil refinery near the mouth of Wood River in 1907.[2] In both districts the multiplication of industrial plants has been accompanied by the development of residential subdivisions.

The superimposition of transportation, urban, and suburban structures on the agricultural pattern of the American Bottoms has resulted in a complex, composite pattern of land utilization. As a consequence of urbanization, the agricultural pattern itself has undergone significant modifications.

The Composition of the Agricultural Pattern

General considerations.—The American Bottoms is included in an agricultural subdivision of Illinois known as the Southwestern Area (Fig. 5). Nearly two-thirds of the income from farming in this area is "derived from sales of wheat, dairy products, and poultry." [3]

Almost three-fourths of the farming area of the American Bottoms is in field crops (Fig. 6). More than half the remaining farm acreage is uncultivable because of lakes and swamps. The acreage of fallow land is more than half the acreage of lakes and swamps. Under "miscellanies," (Fig. 6), is included the combined proportions of acreage used for farmsteads, pastures, and wood lots. The figure suggests that the income of the farming population is derived chiefly from field crops and that a sizable proportion of the acreage is of slight agricultural importance.

[1] Lewis F. Thomas, *The Localization of Business Activities in Metropolitan St. Louis* (St. Louis: Washington University, 1927) p. 88.

[2] *Alton Evening Telegraph*, Centennial Number, January, 1936.

[3] H. C. M. Case and K. H. Meyers, *Types of Farming in Illinois*, Bulletin 403 (Urbana: University of Illinois, 1934), p. 182.

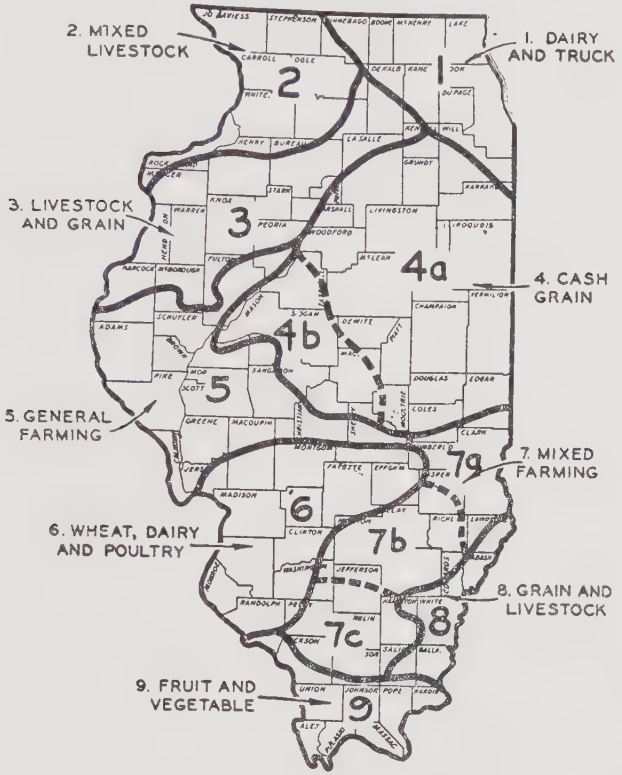


FIG. 5—Types of farming in Illinois.

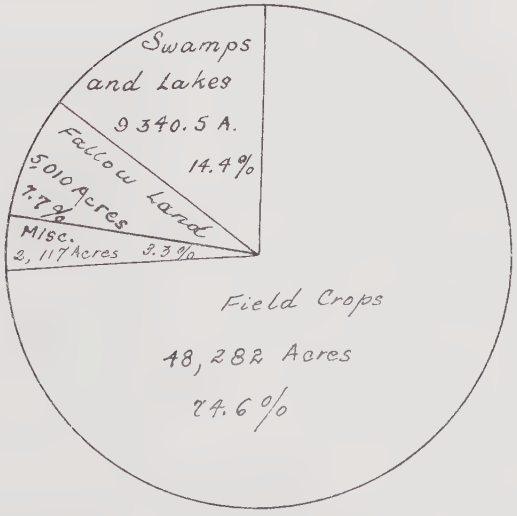


FIG. 6—A proportional classification of farm acreage, including productive and non-productive acreage.

The 781 farms which comprise the agricultural area of the American Bottoms have an average acreage of 82.9, which is substantially lower than the average of 127 for the Southwestern Area.[1] More than two-fifths of the farms have an area of forty acres or less; more than nine-tenths have an area of 160 acres or less (Fig. 7). However, the farms which do not exceed forty acres include only 12.5 per cent of the total acreage in farms; the farms which do not exceed 160 acres include only 65.5 per cent of the total acreage in farms (Fig. 8).

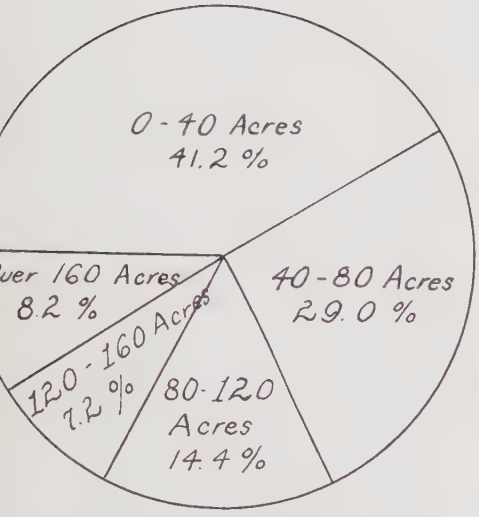
It is significant that the 781 ownership farms[2] are operated by only 578 farmers who control an average acreage of 112.02. Of the farmers, 31.9 per cent operate forty acres or less; 57.3 per cent operate eighty acres or less; and 81.3 per cent operate 160 acres or less (Fig. 9). Many of the farmers operate on a relatively small scale, but some operate on a relatively large scale.

Almost two-thirds of the farms of the American Bottoms have improvements (Fig. 10). Farms with an acreage of 160 or less account for 88.1 per cent of all sets of improvements (Fig. 11). Only 62.9 per cent of all such farms have improvements, however, in contrast to 96.8 per cent of all farms with an acreage in excess of 160. Although the American Bottoms has 578 farmers, there are only 513 sets of improvements. Most of the sixty-five farmers who do not live on the land they cultivate are truck gardeners who live in cities or villages, or on other farms with relatives.

Farms with improvements have an average acreage of 99.31. Many of them are too small, considering the type of agricultural economy practiced, to permit an economical use of modern labor-saving machinery. Consequently an active demand exists for rentable farms. Although it is not unusual for a farmer to cultivate a parcel of land located some distance from the farm on which he lives, most rented land is operated by farmers on contiguous farms. Most of the farmers who care for forty acres or less are truck gardeners who have an ample acreage considering the intensive farming methods used. If this group of farmers is omitted, the remaining 394 farmers, practically all of whom live on farms which they operate, have an average acreage of 154.05. A combination of ownership farms for farming purposes provides for many farmers living on relatively small ownership farms an acreage which is considered ample

[1] *Ibid*, p. 181.

[2] A continuous tract of land treated by the owner as a unit.



G. 7—A proportional classification of farms by acreage range.

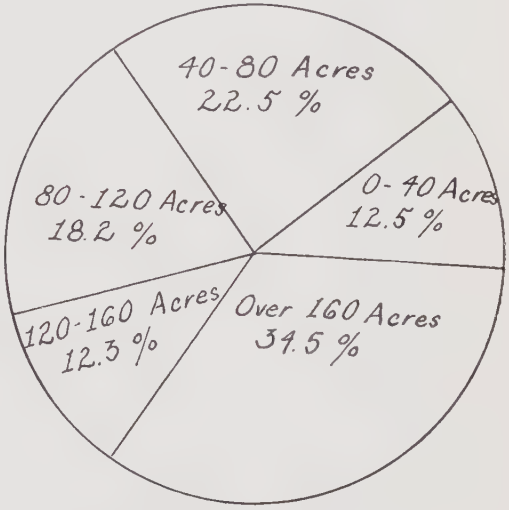


FIG. 8—The combined acreage of farms grouped by acreage range of farms.

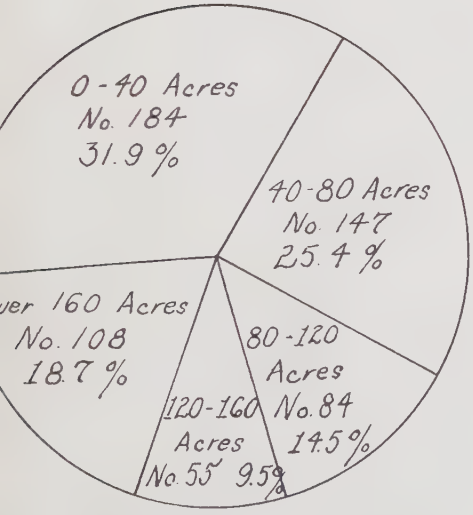


FIG. 9—The proportion of farmers according to the acreage range of land farmed.

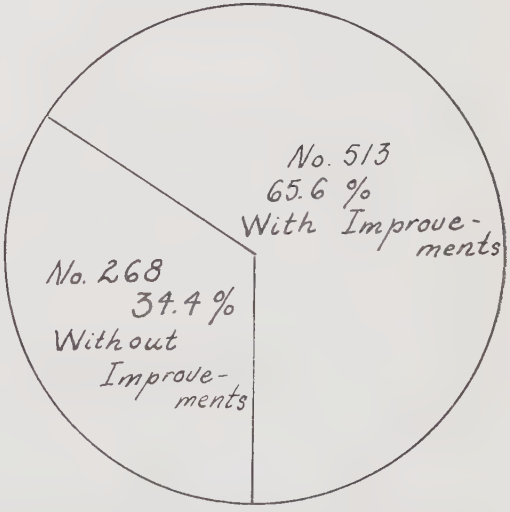


FIG. 10—The proportion of farms with and without improvements.

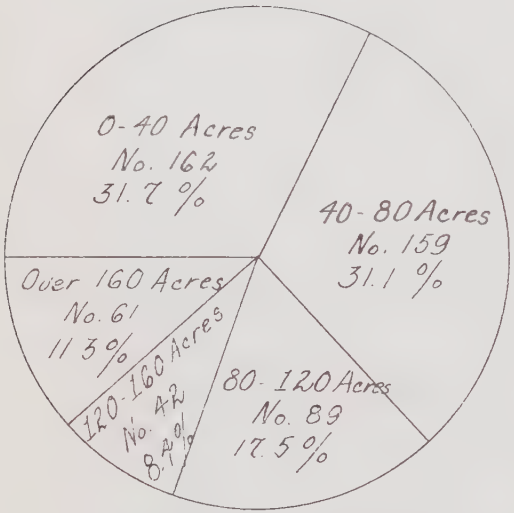


FIG. 11—The proportion of farms with improvements by acreage range of farms.

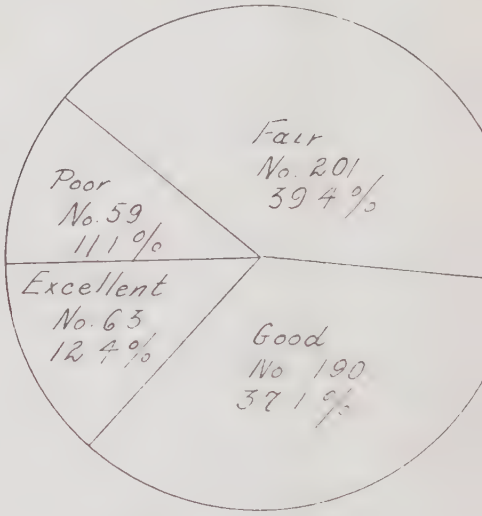


FIG. 12—A proportional classification of improvements as to condition.

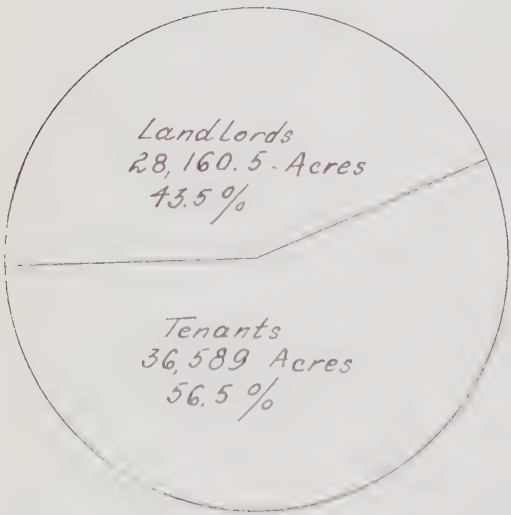


FIG. 13—The proportion of land farmed by tenants and by landlords.

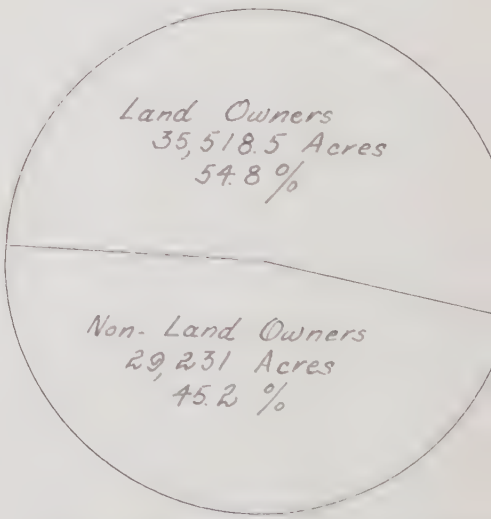


FIG. 14—The proportion of land farmed by land owners and non-land owners.

to warrant the use of the best labor-saving machinery even though the financial outlay is heavy.

The farm improvements as a group are suggestive neither of general poverty nor of marked prosperity (Fig. 12). Over three-fourths of the sets of improvements are either good or fair. The number of farms with fair sets of improvements is but slightly in excess of the number with good sets. The number of farms with excellent sets exceeds but slightly the number with poor sets. The sets of improvements on sixteen of the largest seventeen farms are only fair.

Almost three-fifths of the total farm acreage is operated by tenants (Fig 13). The highest incidence between tenancy and acreage exists among farms exceeding 320 acres, where tenants are in charge of more than ninety per cent of the 19,033 acres represented. Only 43.49 per cent of the total farm acreage is owned and operated by landlords. However, these land owners actually operate 54.82 per cent of the total farm acreage (Fig. 14). The supplementary acreage rented by land owners provides an average increase of more than twenty-five per cent in the amount of land farmed. At present, 68.33 per cent of all farmers of the American Bottoms are land owners (Fig. 15). Over half the land owners who cultivate their own farms have holdings which are eighty acres or less in extent (Fig. 16). Only 4.1 per cent of the land owners who operate their own farms have farms larger than 240 acres.

A few large tenant farms tend to obscure the fact than over two-fifths of the land is farmed by owners; that over half the land is farmed by individuals who own land in the American Bottoms; and that over two-thirds of the farmers are land owners.

The crop pattern.—Wheat and corn are the most important crops by acreage. They embrace over three-fourths of the field crop acreage (Table 2). Twenty-one other kinds of field crops are represented, but none of these crops accounts for as much as six per cent of the total field crop acreage. Wheat, corn, potatoes, sweet corn, and horseradish occupy more than ninety per cent of all the acreage in field crops.

Although wheat and corn are outstanding crops for the American Bottoms as a whole, their relative importance is not everywhere the same. In some places crops of minor rank for the American Bottoms as a whole increase materially in acreage and even become more important than either wheat or corn. On the basis of acreage variations in the relative emphasis placed on the different kinds of field crops, nine different types of agricultural economy have been identified (Table 3). Two cf the types are differentiated also on the basis of animal husbandry.

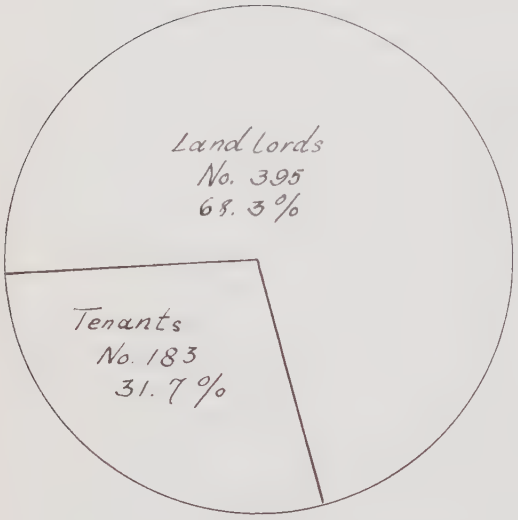


FIG. 15—The proportion of landlords and tenants.

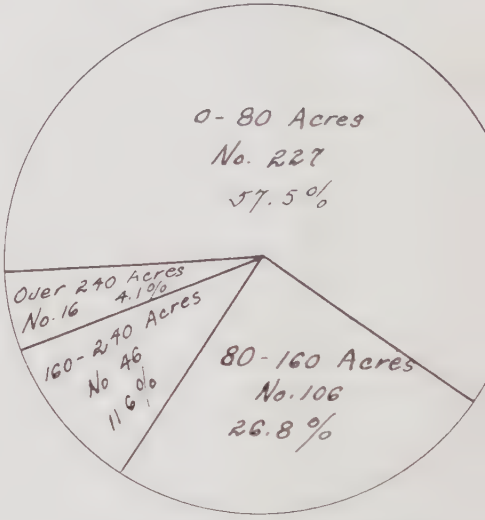


FIG. 16—The proportion of landlords by acreage range.

TABLE 2

THE RELATIVE IMPORTANCE OF FIELD CROPS BY ACREAGE

Field Crops	Acreage	Per Cent of All Field Crops	Per Cent of Farmlands
Wheat	21,797.00	45.16	33.66
Horse Corn	15,591.00	32.49	24.22
Potatoes	2,591.00	05.36	04.00
Sweet Corn	2,151.50	04.45	03.32
Horseradish	1,776.50	03.67	02.74
Cantaloupes	735.00	01.52	01.13
Rye	731.00	01.51	01.12
Alfalfa	679.50	01.40	01.04
Oats	618.00	01.27	00.95
Cabbage	475.50	00.98	00.73
Tomatoes	292.50	00.60	00.45
Soy Beans	213.00	00.44	00.32
Red Clover	210.00	00.43	00.32
Timothy	83.00	00.17	00.12
Cucumbers	49.75	00.10	00.07
Pop Corn	47.50	00.09	00.07
Truck (Misc.)	40.50	00.08	00.06
Sweet Potatoes	35.00	00.07	00.05
Lespedeza	33.00	00.06	00.05
Fruits	17.00	00.03	00.02
Watermelons	12.50	00.02	00.01
Asparagus	4.00	00.00	00.00
Green Beans	2.75	00.00	00.00
Total	48,282.50	99.90	74.43

TABLE 3

THE ACREAGE REPRESENTING THE DIFFERENT TYPES OF AGRICULTURAL ECONOMY

Types of Agricultural Economy	Acreage	Per Cent of Total
Wheat-corn economy with significant minor crops.	16,391.0	25.31
Wheat-corn economy	16,022.0	24.74
Corn-wheat economy	10,862.0	16.74
Truck economy	6,084.5	09.39
Diversified products-livestock economy	4,429.0	06.84
Grain-dairy products economy	3,428.0	05.29
Grain-horseradish economy	3,351.0	05.17
Grain-potato economy	3,162.0	04.88
Cantaloupe-grain economy	1,020.0	01.57
Total	64,749.5	99.93

Except in the section with a grain-dairy products economy and the section with a diversified products-livestock economy, livestock are maintained on farms chiefly to supply family needs. In the two sections mentioned, a significant proportion of the family income is derived from the sale of animals and animal products.

The American Bottoms includes seven sections[1] with a wheat-corn economy, four sections with a wheat-corn economy with significant minor crops, two sections with a corn-wheat economy, and two sections with a truck economy (Fig. 17). Each of the other five types of agricultural economy is represented by only one section. The sections including (a) the wheat-corn type with significant minor crops, (b) the wheat-corn type, and (c) the corn-wheat type comprise over two-thirds of the total farm acreage. The sections representing the various types of agricultural economy show a marked differentiation in the relative importance of various kinds of field crops (Table 4).

[1]A section is a group of contiguous farms with the same type of agricultural economy.

TABLE 4*

THE RELATIVE IMPORTANCE OF FIELD CROPS FOR THE SECTIONS REPRESENTING EACH TYPE OF AGRICULTURAL ECONOMY

Kinds of Field Crops	Types of Agricultural Economy								
	A Wheat-Corn Economy with Significant Minor Crops	A Wheat-Corn Economy	A Corn-Wheat Economy	A Truck Economy	A Diversified Products-Livestock Economy	A Grain-Dairy Products Economy	A Grain-Horseradish Economy	A Grain-Potato Economy	A Cantaloupe-Grain Economy
	%	%	%	%	%	%	%	%	%
Wheat	55.07	73.49	24.02	12.64	37.90	49.60	13.20	18.00	11.54
Horse Corn	23.77	23.86	73.85	20.79	29.86	42.79	37.72	31.82	11.69
White Potatoes	7.32	0.32	0.12	11.31	1.89		2.92	42.55	0.09
Sweet Corn	5.05	0.33		26.96	0.39		5.04	1.75	
Horseradish	2.96			9.09			37.36	3.72	
Cantaloupes		0.04			4.51				55.20
Rye	0.18	0.06			13.43				18.48
Alfalfa	2.36	0.38	0.16	1.10	3.16	5.53	0.12	0.14	
Oats	1.76	0.66	1.53	0.14	3.59		1.76	0.81	
Cabbage	0.11			9.57			0.44		
Tomatoes	0.04	0.08		5.28	0.31		0.29	0.45	
Soy Beans	0.17	0.24	0.24	0.59	2.57		0.55	0.23	
Red Clover	0.56	0.11		0.38	1.10	2.06	0.08	0.52	
Timothy	0.08	0.14		0.21	0.86		0.42		
Cucumbers				1.01			0.08		
Pop Corn	0.29								0.74
Truck (Miscellaneous)		0.14	0.06		0.35				0.59
Sweet Potatoes	0.04			0.64					
Lespedeza	0.11								
Fruits		0.07		0.17					
Watermelons									1.23
Asparagus									0.39
Green Beans				0.05					

*The per cents refer to the total field crop acreage and have been calculated only through hundredths.

38°30'

38°35'

90°05'

90°05'

90°10'

BLUFFS

BLUFFS

ROXANA

WOOD RIVER

EAST ALTON

ALTON

NAMEOKI

EAST ST. LOUIS

GRANITE CITY

MADISON

NATIONAL CITY

VENICE

BROOKLYN

MONSANTO

CAHOKIA

MISSISSIPPI

RIVER

PRAIRIE DU PONT CR.

SOIL MAP

- SANDY LOAMS
- CLAY LOAMS
- SILT LOAMS
- CLAYS
- SANDS
- SWAMPS & LAKES WITH SOIL TYPES UNDETERMINED

AMERICAN BOTTOMS

MADISON AND ST. CLAIR COUNTIES, ILLINOIS

LEGEND

- URBAN & SUBURBAN AREAS
- BOUNDARIES OF AGRICULTURAL SECTIONS
- BOUNDARIES OF SOIL TYPES

0 ¼ ½ ¾ 1 2 3

SCALE OF MILES

DATA ADAPTED FROM UNPUBLISHED SOIL MAPS
COMPILED BY THE UNIVERSITY OF ILLINOIS.
MADISON CO., 1922 ST. CLAIR CO., 1933

FIGURE 19

In the "Southwestern Area" wheat is the the most important money crop, although the acreage of corn is slightly larger.[1] In contrast, the acreage of wheat is somewhat larger than that of corn in the American Bottoms. Aside from a similarity in the importance of wheat and corn, the American Bottoms differs substantially from the "Southwestern Area" in the slight dependence placed on livestock and livestock products. "The poor drainage on many of the bottom land farms is unfavorable to livestock production, as it frequently leads to insanitary conditions around barns and hog houses." [2] Although truck gardening is not important in the Southwestern Area at large, many farmers between East St. Louis and the bluffs have truck farms, and many grain farmers of the American Bottoms raise truck products as "side lines."

The Relationships of the Physical Environment to Agricultural Economy

Relief and drainage.—The most impressive characteristic of the American Bottoms, considered from the standpoint of a general panorama, is the nearly level appearance of its surface.[3] In addition to numerous flats, detailed observations reveal, low ridges, slashes, and inconspicuous slopes. These minor variations, because of their effect on surface drainage and the position of the water table, are exceedingly important. Over twenty-two per cent of the farm acreage is not under cultivation chiefly because of swamps, shallow lakes, and water-logged soils. Where adequate drainage has been provided, former swamps and lake floors, practically indistinguishable in appearance from adjoining areas, have been converted into cultivable land.

Since the flood plain has been created chiefly through the deposition of sediments by the Mississippi River, no parts of it, with the exception of a few semi-artificial mounds[4] and several alluvial fans along the base of the bluffs, are much above the mean stage level of 392.05 feet above mean sea level of the river at St. Louis.[5] The river is at flood stage at

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[1]Case and Meyers, *op. cit.*, pp. 182-84.

[2]*Ibid.*, p. 185.

[3]N. M. Fenneman, *Geology and Mineral Resources of the St. Louis Quadrangle* (Washington: Government Printing Office, 1911), pp. 11-12.

[4]Warren K. Moorehead, Jay L. B. Taylor, and Morris M. Leighton, *The Cahokia Mounds* (Urbana: University of Illinois, 1928), pp. 13-14.

[5]Unpublished chart, Engineers Office, Department of War, St. Louis, 1937.

a height of thirty feet on the river gauge at St. Louis.[1] It has been estimated that only about ten per cent of the American Bottoms is above a flood stage of thirty-five feet.[2] The somewhat precarious position of the flood plain is shown by the fact that the 1844 flood, the highest flood of the upper Mississippi River ever recorded, reached an elevation of 41.3 feet above zero on the St. Louis gauge.[3]

The surface waters drained across the flood plain include water emerging from the upland in addition to water originating on the flood plain. The American Bottoms, aside from small areas draining directly into the Mississippi River, is divided among the basins of Wood River, Cahokia Creek, and Prairie du Pont Creek (Fig 18). The Wood River basin includes three square miles of flood plain, the Cahokia Creek basin one hundred square miles, and the Prairie du Pont Creek basin thirty-six square miles.[4] In the absence of sharp divides on the flood plain, these figures are only approximately correct. The combined upland areas of the three drainage basins are practically four times as large as the combined lowland areas.

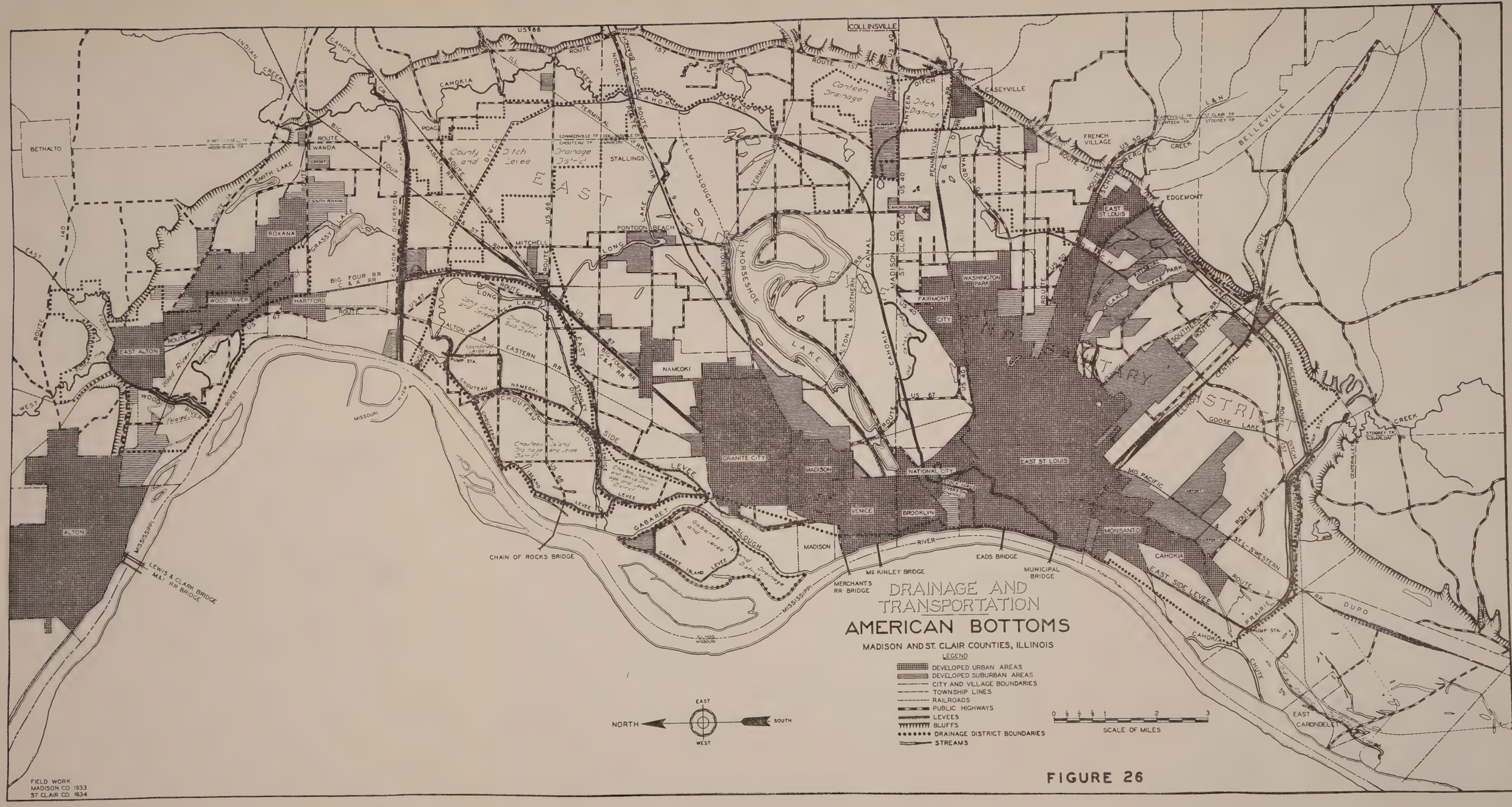
Wood River drains a few square miles of lowland located to the west of the Big Four Railroad and adjoining Alton (Fig. 18). The lowland area drained by Cahokia Creek is bounded on the west by the Big Four Railroad extending from East St. Louis northward to the bluffs near Upper Alton, on the south by the Pennsylvania Railroad extending from East St. Louis to the bluffs at Caseyville, and on the north and east by the bluffs. With the exception of a narrow strip of land along the Mississippi River, the Prairie du Pont Creek basin includes all the American Bottoms to the south of the low divide on which the Pennsylvania Railroad is located.

[1]Zero on the gauge is 379.796 feet above mean sea level.

[2]I. Bowman, and C. A. Reeds, *Water Resources of the East St. Louis District* (Urbana: University of Illinois, 1907,) p. 17.

[3]Unpublished chart, Engineers Office, Department of War, St. Louis, 1937.

[4]Edwin G. Helm, "The Levee and Drainage Problem of the American Bottoms," *Journal Association of Engineering Societies*, XXXV (1905), 92-93.


DRAINAGE AND TRANSPORTATION
AMERICAN BOTTOMS
MADISON AND ST. CLAIR COUNTIES, ILLINOIS
LEGEND
DEVELOPED URBAN AREAS
DEVELOPED SUBURBAN AREAS
CITY AND VILLAGE BOUNDARIES
TOWNSHIP LINES
RAILROADS
PUBLIC HIGHWAYS
LEVEES
BLUFFS
DRAINAGE DISTRICT BOUNDARIES
STREAMS
SCALE OF MILES
NORTH
SOUTH
EAST
WEST
FIELD WORK
MADISON CO 1933
ST CLAIR CO. 1934
BETHALTO
WOOD RIVER
HARTFORD
EAST ALTON
ALTON
ROXANA
SOUTH ROXANA
WANDA
STALLINGS
PONTOON BEACH
MITCHELL
NAMEOKI
CHOUTEAU
GRANITE CITY
MADISON
NATIONAL CITY
VENICE
BROOKLYN
EAST ST LOUIS
FAIRMONT CITY
WASHINGTON PARK
CASEYVILLE
FRENCH VILLAGE
EDGEMONT
EAST ST. LOUIS
MONSANTO
CAHOKIA
CENTERVILLE
EAST CARONDELET
COLLINSVILLE
CANTEEN
STOOKEY TP
SUGARLOAF
CHAIN OF ROCKS BRIDGE
LEWIS & CLARK BRIDGE
M&I RR BRIDGE
MERCHANT'S RR BRIDGE
McKINLEY BRIDGE
EADS BRIDGE
MUNICIPAL BRIDGE
MISSISSIPPI RIVER
MISSOURI RIVER
ILLINOIS
MISSOURI
Canteen Drainage District
Ditch Levee
Drainage District
Sub District
Island and Levee
Gabaret and Levee Island Drainage District
EAST SIDE LEVEE
GOOSE LAKE
LONG LAKE
HORSESHOE LAKE
GRASS LAKE
SMITH LAKE
CAHOKIA CANAL
CHOUTEAU SLOUGH
GABARET SLOUGH
NICKEL PLATE RR
WABASH RR
TERMINAL RR
ALTON & SOUTHERN RR
MISSOURI PACIFIC RR
ILLINOIS CENTRAL RR
BIG FOUR RR C & A RR
PENNSYLVANIA RR
L & N RR
ST L-SWESTERN RR
DUPO RR
US 66
US 67
US 40
US 50
ROUTE 157
ROUTE 159
ROUTE 111
ROUTE 140
ROUTE 3
ROUTE 4
ROUTE 15
ROUTE 16
ROUTE 19
ROUTE 162
FIGURE 26

Under conditions prevailing before extensive improvements were effected (Fig. 18) the drainage of the flood plain was very unsatisfactory, and large areas still are uncultivable because of excess waters. Wood River meandered on the flood plain for a distance almost three times as great as the shortest distance between its point of exit from the bluffs and the Mississippi River. During a period of heavy rainfall in the upper basin, the flood plain section of the channel was unable to accommodate the water that flowed from the upland, and a large section of the adjoining flood plain was inundated.

On emerging from the bluffs, Cahokia Creek, instead of crossing the flood plain directly to the Mississippi only four and one-half miles away, flowed southward close to the foot of the bluffs, almost to the present boundary between Madison and St. Clair counties (Fig. 18). Thence its course extended in a generally southwesterly direction through East St. Louis to the Mississippi. The course which it followed across the flood plain was more than six times longer than the shortest possible route. Heavy local precipitation along its lower course, supplemented by an outpouring of water from the uplands, occasionally over-taxed the capacity of the channel and the natural reservoir called Horseshoe Lake. The ensuing floods inundated farm land and threatened East St. Louis.

Prairie du Pont Creek had a general course extending almost directly from the bluffs toward the Mississippi, but on nearing the river it turned southward and meandered on the flood plain for a distance of about five miles before emptying into the river. North of the creek the surface water moved slowly toward the bluffs where it formed a series of shallow lakes and swamps. No natural channel actively drained the water southward along the foot of the bluffs, but there was a poorly defined movement in that direction. Relatively large areas could not be placed under cultivation because of excess water. The upland section of the Prairie du Pont Basin is only twice the area of the lowland section, whereas the upland section of the Wood River Basin is thirty-nine times larger than the lowland section and the upland section of the Cahokia Basin is more than three and one-half times larger than its flood plain section. Moreover, lakes and swamps, particularly Pittsburg Lake, were effective natural reservoirs in the Prairie du Pont Basin. Consequently, local floods there were less threatening than those in the Wood River and Cahokia basins.

A major problem of individual farmers or of groups of farmers living on contiguous farms is to provide supplementary ditches to facilitate the movement of water to arterial channels. Effective land utilization

depends not only on flood control of the Mississippi River, but also on flood control of upland waters and on the rapid disposal of excess precipitation on the flood plain. Scarcely a year passes without hundreds of acres lying fallow because of excess water at the time when the ground should have been plowed or seeded. On many farms in any year the effects of dry spots and wet spots are reflected in variable yields. As already noted, swamps and lakes withhold large areas from any agricultural use.

Ground water.—Underlying the surface soils the alluvial deposits, which reach depths in excess of one hundred feet, are composed predominantly of porous sands. Studies made to discover the best location for deep wells to serve the upland city of Edwardsville indicate that there is a pronounced movement of underground water from the uplands toward the Mississippi River.[1] On many farms an ample domestic supply of water is secured merely by driving a screened pipe into the ground to a depth of ten or fifteen feet.

Large areas are cultivable only because of rapid under-ground drainage. Moreover, a recession of the water table caused by (a) a cycle of relatively dry years, (b) drainage improvements to facilitate surface movements of water, and (c) heavy withdrawals of ground water for urban and industrial uses, has extended substantially the cultivable areas.

Seldom are excellent yields secured on well-drained land and poorly-drained land during the same season. If there is an abundance of well-distributed precipitation, the well-drained soils yield the more heavily during a protracted summer drought. However, as in 1933, corn on well-drained land may be almost a complete loss while corn on poorly-drained land may yield heavily. Improved drainage has lessened the ability of some areas to withstand droughts but has brought under cultivation areas which are favored by seasons of scanty rainfall.

Soils.—Farmers of the American Bottoms refer only to three types of soils, viz: (a) clays or gumbo, (b) loams, and (c) sandy soils or sands. The clays are characteristic of low, poorly-drained areas or areas which formerly were inadequately drained. The sands are located chiefly on

[1]Oral statements of officers of the Edwardsville Water Company, Edwardsville, Illinois.

ridges or relatively high flats. The loams have intermediate positions with reference to sands and clays or occupy higher land instead of sands.

The only significant area with clay soil is in the northern part of the American Bottoms (Fig. 19). It is relatively low and has poor drainage. In the northeastern part of the bottoms, a sand ridge is the backbone of an agricultural section (Figs. 17 and 19), and scattered patches of sand help to account for a diversity of crops in an agricultural section adjoining the urban centers of Wood River and Roxana. Loams cover a much larger acreage than clays and sands combined.

The loams, in general, are held in higher esteem than either the clays or sands. The loamy type of soil can be handled mechanically more readily than either clay or sand and is highly productive. Loams have considerable capacity to hold water and yet the particles of soil are sufficiently compact to retard its escape.

When clay is wet, it becomes sticky and large masses of soil particles cling together; when clay is dry, large cracks develop and the soil becomes so hard that an ordinary tractor cannot pull a plow through it. If the soil is neither too wet nor too dry, the preparation of a seed bed and cultivation are easy. If heavy rains occur every week or two during the growing season, gumbo soils tend to yield abundantly. The clay types are not in ill-repute because of a deficiency in plant food, but because of mechanical difficulties in tillage and unsatisfactory conditions of soil moisture that are sometimes encountered.

Because of the rapid disappearance of water and the loose cohesion of particles, sandy soils can be worked almost any time, although better when somewhat moist. However, plows are dulled quickly by the coarse heavy grains of sand. Since the sandy types are deficient in plant food, only such crops can be grown profitably on them as will stand a heavy outlay for fertilizers. In the Poag Section, where sandy soil has molded the crop pattern, a ridge with sandy soil is more highly valued than adjoining land with heavy loams (Figs. 17 and 19).

The differentiated agricultural economy of the American Bottoms is due in part to soil variations. Although wheat and corn are grown on both loams and clays, wheat acreage tends to become relatively more important on the clays. Potato and horseradish fields are almost wholly confined to loams. Trucking has reached its best development on loams. Perhaps the most distinctive adjustment of agriculture to a particular soil type is in the Poag Section, where cantaloupes and rye are grown almost exclusively on sands. Although the correlation is not perfect, since many other factors help to determine particular crops

in a given area, farmers in general show intelligence in the selection of crops which are adapted to soil characteristics.

Climate and weather.—Climate exercises a dominant influence on the types of crops that persist in a region over a long period of time. Weather is highly significant in determining the success or failure of crops in a particular season. The farmer's remote interest is in climate; his immediate interest is in weather. Since weather conditions from year to year are characterized by marked variations in the American Bottoms and adjoining areas, climatic data may vary materially from comparable weather data for a given year (Table 5). The weather conditions that prevailed at particular times during past years are not reliable indices as to weather conditions that will prevail at corresponding times during a current year. While the rule of averages reveals the mode, there is considerable variation in the particular time when different farmers engage in such activities as planting, cultivating, and harvesting. Such differences are due in part to individual interpretations of weather phenomena and their effects. Although a farmer may plan his work just as carefully one year as another, weather variations, especially as to precipitation and temperature, result in appreciably different yields. "If we get the right kind of weather, we shall have a good crop" is a current expression among farmers. Scarcely a year passes without the occurrence of some weather phenomena which the farmers consider unusual. Unusual weather phenomena may be considered normal occurrences of the American Bottoms.

The last killing frost in spring occurred on March 29th[1] in 1933; the first killing frost of autumn occurred on November 8th. The time span of 224 days was fifteen days longer than the average length of the growing season, which was a favorable span for raising the customary crops. The precipitation for March and April was slightly above normal; the precipitation for May was almost twice the normal amount (Fig. 20). The wet spring delayed planting and resulted in much fallow land, especially in poorly-drained sections. The mean temperatures for March, April, and May, were close to normal (Fig. 21). The mild, rainy weather for these months favored wheat, except where excess water remained too long on the surface. June, however, was the warmest June on record (1837-1933), and the second driest June. Wheat

[1]Roscoe Nunn, *Annual Meteorological Summary for St. Louis, Missouri* (St. Louis: Weather Bureau, 1934), p. 2.

38°50'

38°35'

90°05'

90°10'

BLUFFS

BLUFFS

ROXANA

WOOD RIVER

EAST ALTON

ALTON

NAMEOKI

GRANITE CITY

EAST ST. LOUIS

MADISON

NATIONAL CITY

VENICE

BROOKLYN

MONSANTO

CAHOKIA

MISSISSIPPI RIVER

PRAIRIE DU PONT CR.

SOIL MAP

- SANDY LOAMS
- CLAY LOAMS
- SILT LOAMS
- CLAYS
- SANDS
- SWAMPS & LAKES WITH SOIL TYPES UNDETERMINED

AMERICAN BOTTOMS

MADISON AND ST. CLAIR COUNTIES, ILLINOIS

LEGEND

- URBAN & SUBURBAN AREAS
- BOUNDARIES OF AGRICULTURAL SECTIONS
- BOUNDARIES OF SOIL TYPES

0 ¼ ½ ¾ 1 2 3

SCALE OF MILES

DATA ADAPTED FROM UNPUBLISHED SOIL MAPS
COMPILED BY THE UNIVERSITY OF ILLINOIS.
MADISON CO., 1922 ST. CLAIR CO., 1933

FIGURE 19

was far enough advanced, before the hot, dry weather began, to assure fairly satisfactory yields, although the quality was affected by shriveling. Corn fired badly and, adversely affected again in July and August by a marked deficiency in precipitation, was an almost complete failure. The graph (Fig. 20) does not show the degree of deficiency that existed in July because it includes a downpour of 3.72 inches that was confined chiefly to the east-central part of the city of St. Louis. The drought, beginning in June, in reality did not end until the fourth week in September (Fig. 20). The mean temperature for each month from February to September inclusive, excepting April, was above normal, which accentuated the effects of the drought. The fall rains, attended by mild temperatures, revived pastures but came too late to be of much benefit to field crops. The severe damage to crops was not due chiefly to a deficiency in precipitation for the year as a whole but to an unfortunate distribution during the year.

The last killing frost in the spring of 1934 occurred March 20th; the first killing frost in autumn occurred November 2d.[1] The time span of 219 days was ten days longer than the average length of the growing season. March, April, and May had rather mild temperatures but a marked deficiency of precipitation (Figs. 22 and 23). The wheat crop, as during the preceding year, came through in fair condition and provided the sole money crop for many farmers. The clay soils, too wet the preceding year, were too dry for the proper preparation of seed beds. For the first seven months of the year the total amount of precipitation for each month was below normal (Fig. 22). When the drought was ended by generous rainfall in August, the deficiency in precipitation for the year had reached 10.5 inches. The rains came too late to render much benefit to the field crops. Only eight years in the preceding ninety-eight had less precipitation than 1934. The effects of the drought were accentuated by the high temperatures and low relative humidity which generally prevailed. June, July, and the first half of August set a new record for a hot season. During the hottest day, July 24, when a maximum temperature of 110° was reached, the relative humidity at 1 P. M. was only thirteen per cent.

Deficiencies in precipitation have resulted in the disappearance of some swamps and shallow lakes. Farmers hold different opinions as to

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[1]Roscoe Nunn, *Annual Meteorological Summary for St. Louis, Missouri* (St. Louis: Weather Bureau, 1935), p. 2.

TABLE 5*

GENERAL CLIMATIC AND WEATHER DATA FOR ST. LOUIS, MO.

Mean annual precipitation	39.55 inches
Smallest amount of precipitation for a year (1930)	23.23 inches
Largest amount of precipitation for a year (1858)	68.83 inches
Mean annual temperature	56.00° F.
Lowest average annual temperature (1875)	52.80° F.
Highest average annual temperature (1922)	60.10° F.
Average date of last killing frost in spring	April 3
Earliest date of last killing frost in spring	Feb. 27, 1878
Latest date of last killing frost in spring	May 22, 1883
Average date of first killing frost in autumn	Oct. 29
Earliest date of first killing frost in autumn	Sept. 30, 1899
Latest date of first killing frost in autumn	Nov. 28, 1902
Average length of growing season	209 days
Shortest growing season on record (1875)	163 days
Longest growing season on record (1922)	253 days

*Data compiled from *Revised Bulletin W*, United States Weather Bureau (Washington: Government Printing Office, 1935), pp. 6, 15, 20, and 24.

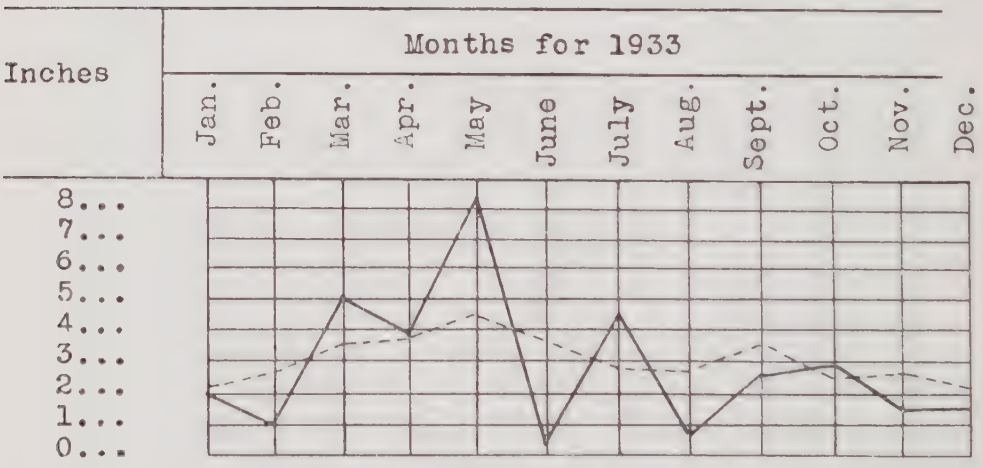
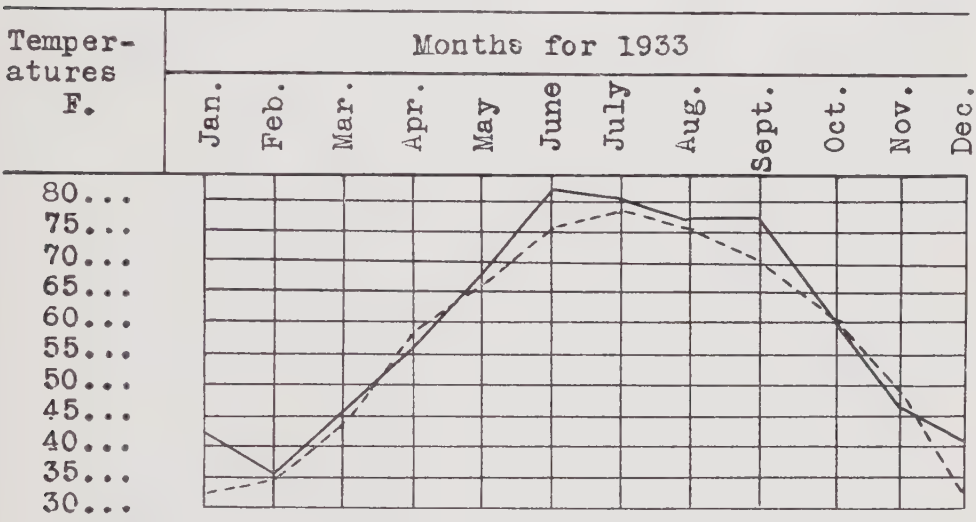


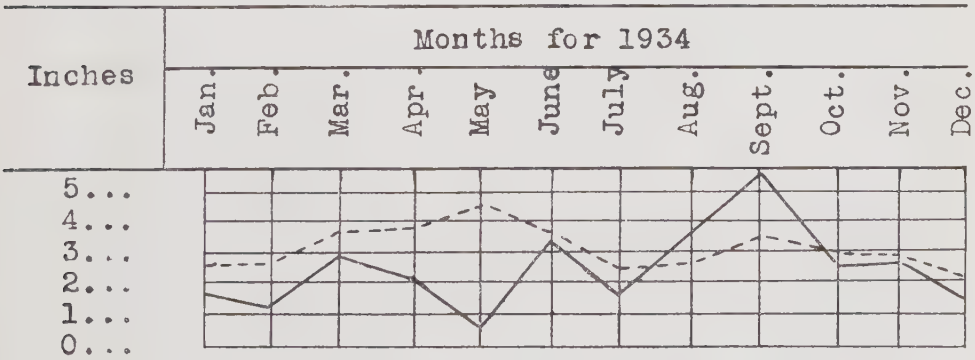
FIG. 20—Monthly precipitation for St. Louis (1933) †

†Roscoe Nunn, *Annual Meteorological Summary for St. Louis, Mo.*, U. S. Department of Agriculture (St. Louis: Weather Bureau, 1934), pp. 3 and 6.

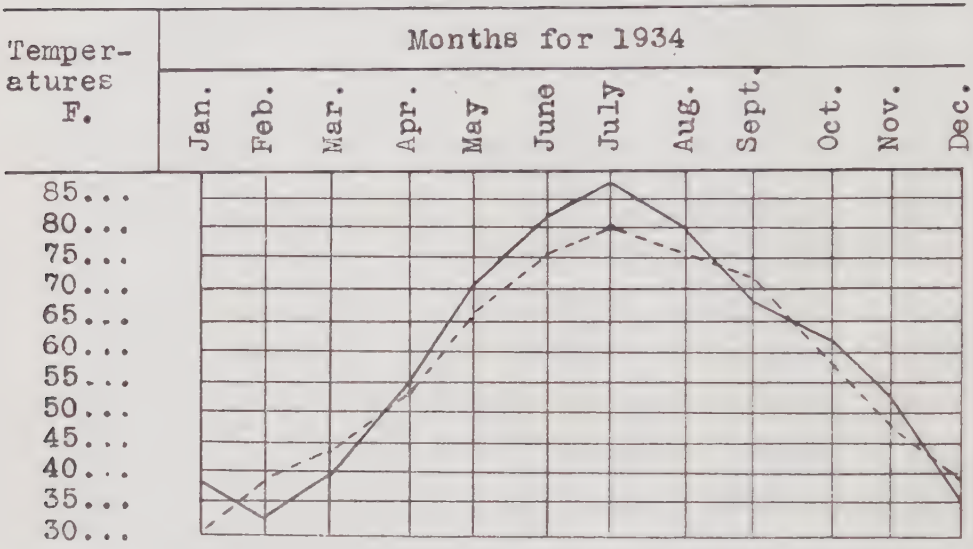
the relative importance of precipitation deficiency and drainage ditches in bringing about this result. Since 1930, when a cycle of relatively low precipitation began, the cultivated areas have been expanded to include former swamp land and even some lake floors (Figs. 24 and 25). The newly reclaimed land during these dry years has given larger yields of wheat and corn than those from much of the older agricultural land. The increasing dependence of farmers on marginal land suggests the probability of economic distress in a wet cycle.



Temperatures during 1933.———— Normals.....
FIG. 21—Mean monthly temperatures for St. Louis (1933) derived from material *ibid.*



Precipitation during 1934.———— Normals.....
FIG. 22—Monthly precipitation for St. Louis (1934) derived from material *ibid.*, 1935, pp. 3, 6.



Temperatures during 1934. ———— Normals.

FIG. 23—Mean monthly temperatures for St. Louis (1934) derived from material *ibid.*

THE RELATIONSHIPS OF OTHER TYPES OF CULTURAL PHENOMENA TO THE AGRICULTURAL PATTERN

Transportation routes.—Most of the network of railroads, chiefly converging on East St. Louis and Alton, was constructed before much serious thought had been given the problem of adequate drainage of the American Bottoms (Fig. 26). From breaks in the bluffs railroad lines were built across the flood plain to river terminals and, at a later date, to bridges providing direct connections with St. Louis. Numerous fills were constructed across swamps, sags, and shallow lakes without reference in most instances to the possible disturbance of natural drainage lines (Fig. 27). Lawsuits have been filed against railroad companies by farmers who claimed that their crops were damaged or ruined by floods which would have been harmless if railroad fills had not interfered with natural drainage.[1] There also have been disputes and legal entanglements between farmers and railroad companies over conditions existing at intersections of railroads and rural highways, where highway approaches are narrow and steep, or where low bridges with inadequate clearances have been constructed over highways (Fig. 28). Railroads present a problem in the construction of drainage ditches. The East Side Levee and Sanitary Board, in constructing the Cahokia Diversion Channel, had to bear the expense of constructing five railroad bridges.

[1]Helm, *op. cit.*, pp. 96-97.

So many railroad lines intervene between National City and the Mississippi River that a closed conduit has been substituted for an open channel in the construction of the Stockyards Diversion Channel.

Although railroad fills interfere with advancing waters, thus accentuating flood conditions on the exposed sides, they have been helpful in functioning as levees in the protection of urban as well as rural property. Proximity to great railroad terminals also favors the farmers in the disposal of products and in the purchase of manufactured goods.

The location of the American Bottoms with reference to great centers of traffic has been an important factor in providing the rural sections with excellent roads. All-weather roads converge on the five highway bridges connecting the East Side with St. Louis. A survey by the Illinois Highway Department in 1936 revealed the fact that the heaviest "through highway traffic" of the state, with the exception of that moving through Chicago, passes through East St. Louis.[1] The Alton-Edwardsville road (Route 159), the Chain of Rocks-Edwardsville road (Route U. S. 66), the Madison-Stallings road (Route 9), and the East St. Louis-Collinsville road (Route U. S. 40) are outstanding examples of arterial highways which incidentally serve rural communities of the American Bottoms (Fig. 26). The construction and maintenance of all-weather roads by state and national agencies have made it possible for the local road commissioners to maintain in excellent condition the reduced mileage of dirt roads.

Urbanization.—The location and expansion of urban and suburban centers have taken hundreds of acres of land permanently out of agriculture. As late as 1890, only a moderate encroachment on desirable agricultural lands had been made. Much of the area of East St. Louis was poorly drained and of slight agricultural value. The development of Madison, Granite City, and Nameoki, especially during the present century, has included excellent agricultural land lying between Horseshoe Lake and the Mississippi River. The lobes of settlement extending from the compactly developed portion of East St. Louis reflect the location of relatively well-drained land.[2]

Before 1907, the Illinois Glass Company and the Federal Lead Company had located industrial plants on the narrow flood plain immediately adjoining the upland of Alton, and the predecessor of the Western

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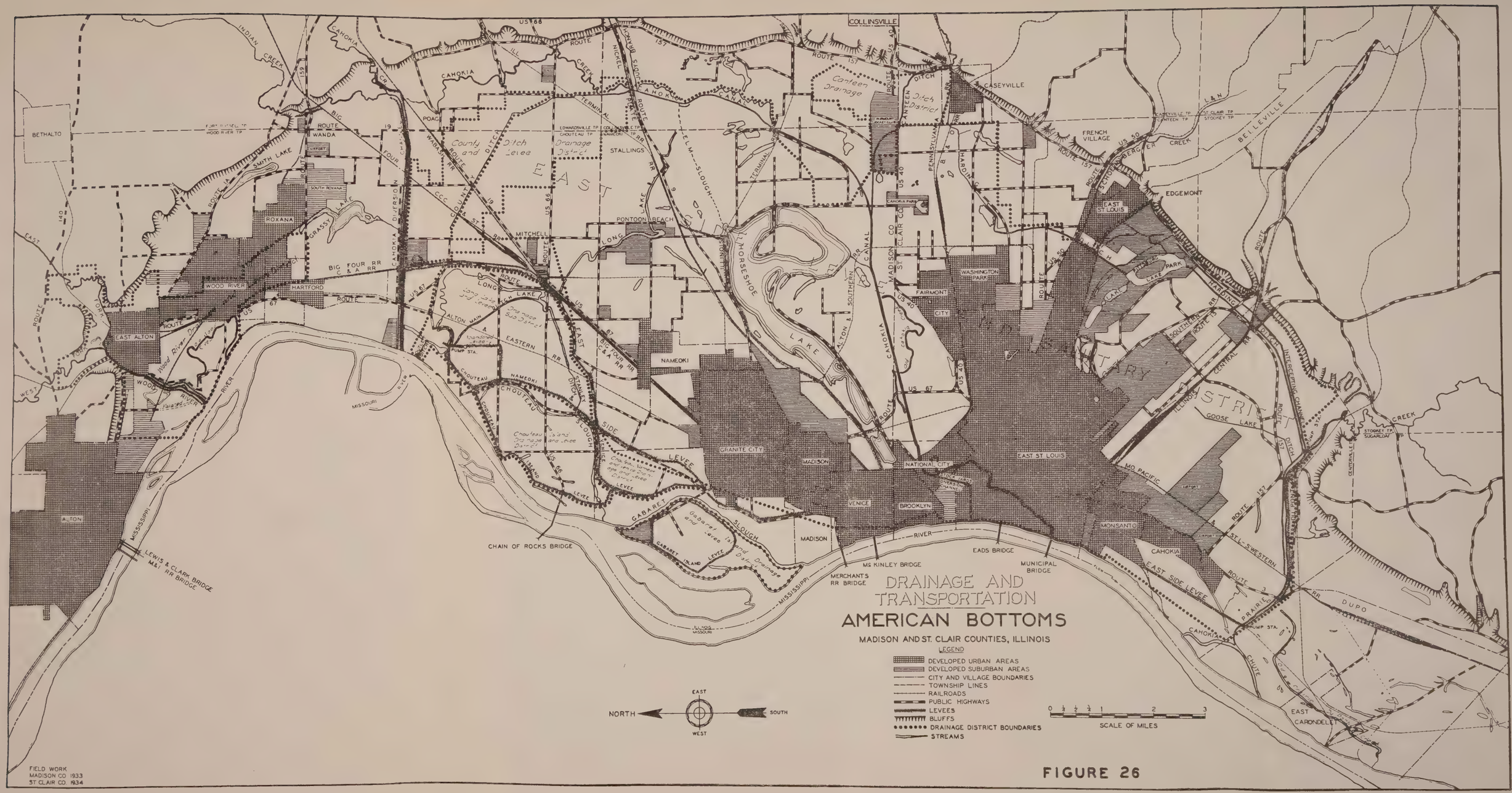
[1]Statement by Governor Horner at the dedication of the East St. Louis-Collinsville Road, October, 1936.

[2]National Resources Committee, *Regional Planning, Part II, St. Louis Region* (Washington: Department of the Interior, 1936), p. 17.

FIG. 24—A small clearing at the edge of a swamp near Horseshoe Lake.

FIG. 25—A temporary shelter for livestock on the former floor of a lake. The lake was noted for fish. Reclamation has been effected through the work of the East Side Levee and Sanitary Board.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MS KINLEY BRIDGE
MERCHANTS RR BRIDGE
EADS BRIDGE
MUNICIPAL BRIDGE
MISSISSIPPI RIVER
MISSOURI RIVER
WOOD RIVER
CHOUTEAU SLOUGH
GABARET SLOUGH
HORSESHOE LAKE
LONG LAKE
GRASSY LAKE
SMITH LAKE
GOOSE LAKE
CANTEEN DRAINAGE DITCH
CANTEEN DITCH DISTRICT
COUNTY LEVEE AND DITCH DISTRICT
CHOUTEAU ISLAND LEVEE DISTRICT
GABARET ISLAND LEVEE DISTRICT
EAST SIDE LEVEE
INTERCEPTING CHANNEL
CHOUTEAU ISLAND
GABARET ISLAND
EAST CARONDELET
DUPO
PRAIRIE DU PONT
STOOKEY TP
SUGARLOAF
CENTERVILLE TP
CANTEEN TP
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ROUTE 140
ROUTE 157
US 66
US 40
US 67
US 50
MO PACIFIC
ST L-SWESTERN
SOUTHERN RR
CENTRAL RR
L & N
PENNSYLVANIA RR
TERMINAL RR
ALTON & SOUTHERN RR
BIG FOUR RR
C & A RR
CCC
CAHOKIA DIVERSION CANAL
MADISON CO
ST CLAIR CO
CANAL
SCALE OF MILES
0 1/4 1/2 3/4 1 2 3

FIGURE 26

FIG. 27—Railroad fill between East St. Louis and the bluffs.

FIG. 28—A low bridge over a public highway southeast of Roxana. This bridge has led to lawsuits between the railroad company and farmers because of inadequate clearance for farm machinery.

Cartridge Company had built a plant on the lowland at the junction of the East and West forks of Wood River. The land occupied by these industrial plants was of slight agricultural value, however, and practically all the employees of these companies lived on the upland of Alton.[1] Since 1907, when the Standard Oil Company located a refinery on agricultural land, which since has become part of the city of Wood River, urbanization of a large portion of the flood plain has been rapid (Fig. 1). Wood River and Roxana are located chiefly on a broad sandy ridge formerly noted for the production of cantaloupes and watermelons. Hartford occupies a ridge, once considered excellent agricultural land, between Grassy Lake and swamps along the Mississippi River. Suburban expansion associated with these settlements has been on relatively high, productive land.

Farmers of the American Bottoms believe that the pollution of the air by many industrial plants is detrimental to the growth of crops. They believe also that wheat and corn are less sensitive to such pollution than most crops. Through law suits brought against the Federal Lead Company, it was established legally that poisonous fumes emitted from the smokestack had injured crops over an area of several square miles. In order to carry the fumes to a height which would eliminate their deleterious effects, the company constructed a smokestack which has a diameter of forty feet at the base and towers to a height of 450 feet.

Various "nuisances," which may or may not be harmful, react unfavorably on the rural population. Granite City has an enclosed sewer to the river levee at the western edge of the city. However, from the river levee to Gabaret Slough, the sewage flows in an open ditch (Fig. 29). Two establishments near East St. Louis and one near Alton, with wretched-looking sheds and pens, have many hogs which are fattened on garbage. The village of Hartford owes its existence to the construction of a large tannery by the International Shoe Company. This company has attempted to establish a tannery in a location where there will be no objection to unpleasant odors.[2]

Urbanization has given a speculative value to adjoining agricultural land. Few non-residents who have purchased land as a speculation are interested in maintaining their farms either as to productivity or im-

[1] *Alton Evening Telegraph*, Centennial Number, January 15, 1936.

[2] *Ibid.*

provements. In some instances, as near Roxana, subdivisions established from land taken out of cultivation have not been financially profitable (Fig. 30). The potential use of the land for industrial purposes is not conducive to the development of high class farms.

Proximity to urban centers helps to assure farmers an adequate supply of labor when their work load is heavy. However, the wages expected by urban dwellers deter farmers from engaging any more help than is absolutely necessary. In many instances farmers with the aid of members of their families are able to do most of the work by a heavy investment in labor-saving machinery and by stressing crops that do not require a large outlay for labor. Some farmers, attracted by relatively high urban wages, secure part-time employment in factories. Some young people work in urban centers but live on farms operated by their parents.

A moderate movement of city people into rural areas for the purpose of securing subsistence acreage is observable. However, farmers desirous of keeping out undesirable neighbors are reluctant to sell small portions of their farms. Real estate men, especially near East St. Louis, have been fairly successful in selling small tracts to city people. A few farmers with tractorized outfits live in urban centers either because (a) they are farming land which never had a set of improvements, or (b) former improvements have become worthless. Most farmers who live in urban communities farm small tracts intensively.

The adoption of comprehensive and substantial plans for adequate drainage and for the control of floods would not have been practicable without the additional wealth which urbanization has conferred on the American Bottoms. In 1907, when such improvements were undertaken extensively, over ninety per cent of the total assessed valuation of all taxable property of the American Bottoms, which reached a total slightly over one hundred million dollars, was on urban and suburban property.[1] From the standpoint of the value of property affected, the most important two levee and drainage districts of the American Bottoms are (a) the East Side Levee and Sanitary District and (b) the Wood River Drainage and Levee District (Fig. 26). Both districts

[1]Personal files of E. F. Harper, Chief Engineer for the East Side Levee and Sanitary District, East St. Louis, 1921.

FIG. 29—The Granite City sewer, from the top of the river levee.

FIG. 30—A premature subdivision of farm land for suburban development. Streets, bordered by rows of trees, have been provided, but no buildings have been constructed.

were organized primarily to provide protection for urban and suburban communities. Incidentally, thousands of acres of farm land also were benefited.

In the organization of the East Side Levee and Sanitary District (1907), the activating purpose of which was to provide protection for East St. Louis, it was deemed desirable to include over ninety-six square miles of flood plain.[1] Over two-thirds of the area thus included was classified as farm land. The western boundary of the district extending southward from Granite City was located along or near the bank of the Mississippi River in order to provide protection for developed urban centers and in anticipation of further suburban development southward from East St. Louis. Northward from Granite City, the boundary fronting the river was located a considerable distance from the river in order to provide for the expansion of river water during periods of severe floods. It was planned to construct a river levee just inside this western boundary. The section of the levee from Prairie du Pont Creek northward to Mitchell was constructed as planned. The levee was extended northward from Mitchell with a location outside the district, however, so as to effect a "tie in" with the south levee of the Cahokia Diversion Channel (Fig. 26). Hundreds of acres of farm land, located immediately to the south of the Cahokia Diversion Channel, were thus incidentally given protection against river floods, although outside the district.

To the north of the portion of East St. Louis which extends to the bluffs, a narrow belt of farms located on a relatively well-drained series of alluvial fans at the foot of the bluffs was not included in the district; however, to the south of this lobe of East St. Louis, the boundary line was extended along the foot of the bluffs where the axial line of drainage for this part of the flood plain is located.

Mr. E. F. Harper, Chief Engineer for the East Side Levee and Sanitary District, has listed the original objectives as follows:

> The general plan for the improvement of the District provides for the construction of the following works: (1) A diversion canal for Cahokia Creek, with levees on each side, from a point where the creek emerges from the bluffs, westwardly to the Mississippi River; (2) An improved channel for Prairie du Pont Creek, from the southeasterly corner of the District westwardly to Cahokia chute, connecting with the Mississippi River; (3) A levee along the river front from the Cahokia Creek diversion channel levee, to Prairie du Pont Creek channel, constructed to a grade 5 feet above that of the flood of 1844; (4) An improved channel for that

[1] *Ibid.*

> portion of Cahokia Creek lying within the District and below the diversion canal; (5) Flood gates and a pumping station at the outlet of Harding Ditch and the outlet at Cahokia Slough; (6) A closed conduit, having a capacity of 2000 cubic feet per second, for an outlet for the improved channel of Cahokia Creek from the National Stock Yards to the river at Brooklyn; and (7) An intercepting canal along the easterly side of the District, for intercepting the flow of the creeks entering the District from the bluffs, from the Prairie du Pont channel to Judy's Branch.[1]

With the exception of the last one objective, all of these original purposes have been realized (Figs. 18 and 26). The closed conduit from the National Stockyards to the river was the last of six projects to be completed. The intercepting channel was begun in 1920 but was only partially completed when further work was stopped by court order.

Although Harding Ditch, extending northward from Prairie du Pont Creek had been constructed prior to 1907, it was of slight value because of sedimentation. It was widened, deepened, and extended northeastward to Caseyville. A tributary ditch was dug from the place where Schoenberger Creek emerges from the upland to the Harding Ditch. Horseshoe Lake, as a part of the improved Cahokia drainage system, and Pittsburg Lake, as a part of the Prairie du Pont drainage system, are considered invaluable as temporary reservoirs for flood waters.

Improvements effected by the East Side Levee and Sanitary Board led to the organization of two additional districts—namely, the County Ditch Drainage and Levee District and the Canteen Creek District (Fig. 26). The former was organized to extend a ditch from the northern terminous of the Cahokia Ditch northwestward toward the Cahokia Diversion Channel as a substitute for an earlier ditch that had almost disappeared through sedimentation. This district in part overlaps the East Side Levee and Sanitary District. The Canteen Creek District was organized for the purpose of substituting a ditch extending from the bluffs to the Cahokia Ditch for the meandering and shifting channel of Canteen Creek.

The improvements effected by the East Side Levee and Sanitary Board have beneficially affected farms far beyond the confines of the district. Threats of excess waters throughout both the Cahokia and Prairie du Pont basins have been reduced through (a) the diversion of upland water directly to the Mississippi River, (b) the construction and maintenance of fixed graded channels, (c) the construction of pumping stations where considered desirable to assist in the rapid removal of

[1] *Ibid*

accumulating waters, (d) the maintenance of a low level of water in Horseshoe and Pittsburg lakes in order that flood waters can be accommodated, (e) the construction of a river levee designed to protect the levee and sanitary district from the highest probable flood of the Mississippi River, and (f) the confinement of channels by levees where deemed advisable.

The practical effects of the work of the Levee and Sanitary Board are visualized more readily in the rural than in the urban areas. Damage to crops because of unsatisfactory drainage has been lessened on hundreds of acres and a substantial acreage, formerly considered uncultivable, has been placed under cultivation. However, drainage improvements probably should not be given sole credit for the improved conditions. The practical importance of the river levee is reflected in the fact that a similar grade of farm can be sold with less difficulty and at a higher price per acre if it is located inside rather than outside the East Side Levee (Fig. 31).

The Wood River Drainage and Levee District was organized (1910) primarily to provide protection from upland waters for the grounds and buildings of two large industrial plants.[1] Incidentally, the boundaries of the district were drawn so as to include over one thousand acres of farm land. The channel of Wood River extending across the flood plain has been straightened (Figs. 18, 26, and 32), and the gradient of the channel at the foot of the bluffs has been increased by lowering the limestone floor of the channel so as to increase the down-river slope. These improvements have been effected to accelerate the rate of movement of bluff waters across the flood plain. A levee extending from the bluffs to a natural levee adjoining the Mississippi River has been placed on each side of the improved channel. The owners of protected farms are impressed with the effectiveness of the work done.

The foregoing discussion has presented the general relations which the rural population of the American Bottoms sustains toward the natural and cultural environments. The natural environment includes (a) a nearly flat or slightly undulating surface, (b) productive soils, (c) large areas of relatively well-drained land but an imperfectly developed drainage pattern as evidenced by the widespread distribution of lakes and swamps, (d) a low elevation relative to adjoining uplands and the Mississippi River which exposes the plain to flood hazards,

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[1]Pickels and Leonard, *op. cit.*, p. 46.

FIG. 31—A section of the river levee west of Granite City. Slag from steel mills has been placed on the outside slope. A dirt road parallels the outer side of the levee.

FIG. 32—The new mouth of Wood River with the Mississippi River in the distance. Rip rap has been placed on the inner slope of the levee where it extends across the former channel of Wood River.

(e) a mean annual precipitation of 39.55 inches with a late spring and early summer maximum, and (g) a growing season which averages 209 days in length.

The agricultural pattern is comprised predominantly of fields of crops interrupted here and there by sets of improvements. Locally differentiated crop combinations permit the resolution of the agricultural pattern into sections characterized by different types of economy. The structure of the agricultural pattern depends on (a) interrelationships within the pattern, (b) relationships with the natural environment, and (c) relationships with other types of cultural phenomena which are included in the areal complex of the American Bottoms.

PART II

OBSERVATIONS CONCERNING THE AGRICULTURAL ECONOMY OF THE AMERICAN BOTTOMS

The Relative Importance of Farm Acreage

The area of the American Bottoms is slightly in excess of one hundred thousand acres. The urban and suburban districts include approximately twenty-eight per cent of the total acreage. The combined acreage of (a) swamps and water bodies not associated with operated farms, (b) resort centers and scattered small settlements, (c) rural railroad property and highways, and (d) rural levees and drainage ditches, constitutes approximately seven per cent of the total acreage. The remaining acreage, which constitutes almost two-thirds of the total, is composed of operated farms.

Differentiated Agricultural Economies

An agricultural pattern with the differentiated types of economy represented (Fig. 17) has been promoted by (a) diversified conditions of the physical environment, (b) the presence of urban and suburban centers on the flood plain and also on the uplands on both sides of the Mississippi trough, and (c) individual and collective initiative. The outstanding characteristics of the sections with each type of agricultural economy are as follows:

1. The wheat-corn sections have a predominating acreage of sandy loams and a substantial acreage of clay loams. They also are characterized by excellent drainage of most of the field crop acreage. A distinct preference is shown for planting wheat in the sandy loams and corn in the clay loams. If a farm has both well-drained and poorly-drained land, wheat probably will be planted on the former and corn on the latter. Several considerations favor the production of wheat. (a) The labor requirements are light; (b) the actual cash outlay is small; (c) the soil

is not rapidly impoverished; (d) the net financial returns are considered as promising as for other kinds of field crops; (e) weeds are kept under control; (f) the grain has excellent keeping qualities; (g) a ready market prevails; and (h) it has been customary to devote a large acreage to wheat. Several considerations also favor the production of corn. (a) The labor requirements do not conflict seriously with the labor requirements of wheat; (b) the ears of corn and stover provide excellent feed for the limited head of live stock; and (c) the surplus is salable readily and provides a supplementary source of income. The extension of corn acreage at the expense of wheat acreage is not favored, however, because of the heavier labor requirements and the belief that wheat promises larger net returns.

2. In the sections where a wheat-corn economy is modified by significant minor crops, the conditions relative to soils, relief, and drainage are similar to those in the wheat-corn sections. Ready accessibility to markets, especially St. Louis and East St. Louis markets, and the influence of practical leaders have been important factors in the introduction of crops as "side lines." The important minor crops are sweet corn, potatoes, horseradish, and alfalfa. These minor crops are grown chiefly on sandy loams and, therefore, tend to compete for acreage with wheat rather than with corn.

3. The corn-wheat sections are characterized by clays (gumbo) and inadequate drainage. Corn is the major crop, not because the physical conditions are considered ideal, but because the farmers have not been able to discover some other staple crop that can adapt itself as satisfactorily to unfavorable soil conditions associated with excess waters or a deficiency of precipitation. Wheat grown on the clays produces tall weak stalks which rather readily lodge. Some seasons as in 1933 are more favorable for wheat than for corn. Such seasons customarily result in an increased acreage of wheat the succeeding year.

4. The isolation of the grain-potato section by swamps and water bodies has protected it from incursions of the potato blight which has affected the potato crop on most parts of the American Bottoms. Sandy loams which favor the production of wheat and corn also are considered ideally adapted to the growing of potatoes. Capable leadership among the farmers and cooperative endeavors have been helpful in the maintenance of the potato industry as a major farm project.

5. The grain-horseradish section was chiefly a corn-wheat section until about twenty years ago. The introduction of horseradish culture on a large scale has been favored (a) by the leadership of two

brothers, (b) by the presence of suitable loams, (c) by proximity to East St. Louis where unskilled laborers for farm work are available, and (d) by the discovery or creation of important markets for "radishes" in the East. A larger acreage of corn than of wheat is favored (a) by the heaviness of the loams and (b) by the fact that corn is considered a better crop than wheat in rotation with horseradish.

6. The truck sections adjoin East St. Louis and suburbs, which provide important markets for truck products and also contribute additional laborers as needed for field work. However, the most important markets for truck products are in St. Louis on the opposite side of the Mississippi River. Probably the best trucking area is located on an alluvial fan at the foot of the bluffs where a sandy loam type of soil prevails. This fan also is characterized by excellent drainage. The trucking area has been expanded, however, so as to include heavy soils and poorly-drained land. Due in part to physical differences among the truck farms and in part to differences in the ability of truck gardeners, the truck farms are not uniformly highly productive.

7. The cantaloupe-grain section has a sand ridge which favors the production of cantaloupes and rye. Watermelons formerly were important, but a blight has caused the farmers to curtail production of them. Wheat and corn are of some importance because of the extension of farms into the loams adjoining the sand ridge. Dependence is placed chiefly on local urban centers for the disposition of the melon crop.

8. The diversified crops-livestock section includes a part of the flood plain and a part of the rolling uplands. The loams of the flood plain portion are interspersed with sands. Diversity of soils and relief have contributed to a diversity of crops. Slopes unsuitable for cultivation on upland and sweet soils on the flood plain have contributed to the importance of pastures and hay fields. Excellent drainage has favored the keeping of livestock, while proximity to the Alton Industrial District provides an excellent market for dairy and poultry products.

9. The grain-dairy products section resembles the diversified products-livestock section. However, the flood plain portion has less diversity of soils and less diversity of crops. Moreover, the livestock industry is confined to the upland portion of the section where it is favored by excellent drainage and slopes better adapted to pasturage than to field crops.

Farming Operations

Tractors are in general use for plowing, disking, and harrowing, and for cutting small grain. Draft animals still are considered necessary for cultivating crops and for miscellaneous hauling. Fall plowing is customary, if weather conditions permit, in all fields where the crops are gathered in time. Fall plowing (a) assists in the control of weeds, (b) promotes the early decay of organic matter that is turned under, (c) exposes burrowing insects to the rigors of winter weather, (d) permits an improvement in the mechanical condition of the soil through the mellowing effects of freezing and thawing, and (e) furthers the work of producing crops during the next growing season. Wheat and rye are planted in the fall; practically all other planting is done during the first few weeks of the growing season. The length of the growing season provides a time span of several weeks during which fields can be seeded to various kinds of crops with a probability of maturing before the first killing frost of autumn. For the cultivation of various kinds of crops, riding cultivators, drawn by mules or possibly horses, are in common use except in fields of truck products where one-mule walking cultivators frequently are employed. Attempts are made to distribute the work of preparing seed beds, planting, cultivating, and harvesting so that a minimum of extra help will be necessary. In spite of such attempts practically every farmer requires help during some part of the year.

Trends

A consideration of the relations of the rural population to the physical and cultural environments suggests several distinctive trends.

1. The urban and suburban areas are continuing to expand, and it is conceivable that new centers of population will be established. More appealing opportunities in urban centers than on farms are inducing young people, when they become old enough to engage in vocational pursuits, to leave the farms. As improvements become obsolete, some farmers are moving to cities or villages but are continuing to operate their farms. The increasing importance of urban markets is stimulating farmers to engage in trucking or in the raising of "side line" crops. City people are purchasing relatively small acreage tracts with the purpose of engaging in subsistence farming while depending primarily on positions in urban centers.

2. Grain farmers are establishing "side line" crops, and grain farmers with "side line" crops are becoming truck gardeners. Large farms are

being subdivided because of the expanding truck acreage. Modest improvements are being established on the subdivisions, which are contributing to an increase in the density of population of the rural areas. The automobile and modern highways have minimized the advantage of a truck farm being located in proximity to a city where laborers are available. Farmers throughout the American Bottoms are becoming truck-minded.

3. The apparent prosperity of the farmers at the periphery of the American Bottoms along the foot of the bluffs is suggestive of the possibilities of extending the livestock industry, thus far confined to the relatively high land adjoining the bluffs, over the flood plain. Conditions are more favorable than formerly because of the effectiveness of drainage projects. The daily passage of trucks loaded with dairy products or poultry and eggs across the flood plain to urban markets impresses farmers with the importance of near-by markets for the sale of such products.

4. Flood control and drainage have contributed toward a more rapid depletion of soils, which is being reflected in somewhat reduced yields. An occasional pile of crushed limestone and scattered fields with soil-building crops suggest that the farmers are beginning to turn their attention to the conservation of soils. An increasing alternation of crops suggests that the thought trend of the farmers is in the direction of a systematic rotation of crops.

5. The introduction of the tractor has increased the capital expenditures for equipment. Draft animals still are considered necessary on most farms. A few farmers depend exclusively on tractors. The trend is toward the general use of labor-saving equipment with tractors entirely supplanting draft animals.

6. A general belief prevails among the farmers that in the somewhat remote future the agricultural pattern will have disappeared from the American Bottoms. They visualize the flood plain as one large industrial area. It is conceived that wage earners will live in modest homes on the flood plain, but the homes of the wealthier people will be placed on the adjoining bluffs. Such expectations tend to cause the farmers to value their land out of all proportion to its true worth in the production of crops.

APPENDIX

RESEARCH TECHNIQUE [1]

A general survey was made of the Mississippi flood plain between Alton and Chester, Illinois. A decision was reached to limit the detailed investigation to the notable expansion of this flood plain between Alton and Prairie du Pont Creek for the following reasons: (a) the area, embracing over one hundred thousand acres, was considered adequate; (b) the intermingling of rural and urban areas tended to set the widest part of the flood plain apart from the long narrow belt extending southward from the Prairie du Pont Creek to Chester; (c) the area apparently had a marked concentration of wealth, suggesting possibilities of an advanced state of relationships with the natural environment; and (d) the term, American Bottoms, once applied to the entire flood plain between Alton and Chester, locally had come to mean only the notably widened part of the flood plain, thus further suggesting its importance as a definite areal unit.

A superficial consideration of the cultural pattern of this restricted area suggested that a major line of geographic research might embrace (a) an agricultural economy, (b) an urban and suburban economy, (c) a transportation economy, (d) a study of flood control and drainage, or (e) a detailed study of these various lines of research singly and in combination. The decision was reached to stress the agricultural economy. The area presented an opportunity to study the effects on agriculture of urbanization and closely related cultural phenomena.

A continuous tract of land treated by the owner as a unit was considered an ownership farm. All land designated by acreage is considered farm land by the township assessors. However, for purposes of an agricultural study only those ownership units were included which were being used for agricultural purposes. The acreage of swamps was included only if it constituted a part of an operated farm. In the compilation of factual data, the ownership farm was considered the basic unit. From the standpoint of land utilization by farmers, it was recognized that the acreage under the control of each farmer is more im-

[1] An adaptation of a detailed discussion in the appendix of the dissertation.

portant than the acreage of an ownership farm. Consequently, the acreage under the control of each farmer also was tabulated.

At the outset of the study, an accurate base map was indispensable. Advance copies of topographic maps covering the American Bottoms were provided through the courtesy of members of the Illinois State Geological Survey. Photostats, with a scale of one inch to the mile, were made of the appropriate parts of these maps, and the photostats were combined to form one map. A base map was derived from this topographic map.

The location and acreage of each ownership farm was ascertained by a scrutiny of the assessors' books and cross-checked in the field by means of inquiries among farmers. Chief dependence for the delimitations of non-agricultural land — developed urban areas, developed suburban areas, and swamps not associated with operated farms — was placed on field work, cross-checked by data on topographic maps and plats of urban and suburban areas. Since an ownership farm was taken as the basic unit in collecting data, parts of the bluff slopes and u land were included if they were portions of farms which also included parts of the flood plain.

The boundaries of the ownership farms were placed on a base map Each farm was classified as to the type of agricultural economy represented on the basis of the composition of the field crop pattern. This map provided the data for the construction of a map showing the distribution of the sections with different types of agricultural economy.

Mr. R. S. Smith, Chief of the Soil Survey, College of Agriculture, the University of Illinois, provided advance sheets of a soil survey of St. Clair County and loaned the office copy of a soil map of Madison County. Mr. E. A. Norton, associated with the Soil Survey, supplied a table correlating the soil types of the two counties. The soil types were checked against the practical classification of farmers. The chief outcome of this cross-checking was the construction of a simplified soil map including five major types of soil, considered from the standpoint of recognized differences by practical farmers. The distribution of soil types has been shown on a map which includes the boundaries of the agricultural sections, in order to facilitate a comparative study of the relations of soil types to the types of agricultural economy.

Drainage and levee districts.—Private blue prints, showing farm boundaries and acreages, have been made of the several drainage and

levee districts. The drainage and levee districts provide a means of classifying farm lands. However, they have had only a moderate influence in the differentiation of types of agricultural economy. Consequently, it was considered preferable to treat them incidentally in relation to the agricultural sections with which they are associated.

Work sheets applicable to farm units.—Before undertaking the necessary field work, the writer made a work sheet which embraced the following topics:

> (*1*) location, (2) name of owner, (3) name of farmer, (4) number of years on the farm, (5) previous ownerships, (6) number of acres, (7) boundaries, (8) kinds of crops with acreage, (9) areal distribution of different kinds of crops, (10) comparison with previous year or years, (11) experimentations with new kinds of crops, (12) rotation of crops, (13) waste land and fallow land, (14) surface features, (15) natural and artificial drainage, (16) erosion and sedimentation, (17) kinds of soils and their distributions, (18) maintenance of soil fertility, (19) preparation of seed beds, (20) planting, (21) caring for growing crops, (22) garnering the crops, (23) disposition of crops, (24) gardens and fruit trees, (25) pastures, (26) livestock, (27) fences, (28) buildings, (29) domestic water supply, (30) water for livestock, (31) floods and flood protection, (32) favorable and unfavorable conditions affecting production, (33) supplementary means of making a living, (34) help needed, (35) seasonal distribution of work, (36) improvements or changes contemplated, (37) cooperation with neighbors, (38) influence of government, (39) influence of individuals or groups of individuals, (40) trading centers, (41) educational and religious facilities, (42) future plans, and (43) miscellaneous facts suggested by the particular farm and farmer.

The grouping of ownership farms.—A reconnaissance of the American Bottoms, before detailed work was begun, suggested a wheat-corn pattern with minor modifications. However, detailed tabulations of individual farms revealed significant differentiations as well as significant similarities in farm patterns. It became evident that differentiations were sufficient to justify the recognition of nine different types of agricultural economy. Furthermore, it became evident that contiguous farms in the same restricted neighborhood with a few exceptions had the same type of crop pattern. Thus it proved feasible to subdivide the rural area into sections with differentiated agricultural economies. The boundaries of the different sections suggested that (a) differences in soil types, (b) differences in relief, (c) proximity to population centers, (d) relative isolation because of swamps and water bodies, (e) the speculative value of land, and (f) local leadership were important factors in contributing to these differentiations. Furthermore, in most instances where an

individual ownership farm did not conform to the pattern of surrounding farms, it was found that the farm was being operated in conjunction with other farms. The total acreage managed by the same farmer almost invariably conformed to the local crop pattern.

Field work in 1933 and 1934.—Unless otherwise stated in the thesis, field data for the Madison County area were secured in 1933 and for the St. Clair County area in 1934. The weather conditions for both years were strikingly similar, and it is believed that the crop patterns in the American Bottoms were much the same for the two growing seasons.

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[1] A more comprehensive bibliography has been included in the complete dissertation.